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EXAMINER	
SMITH, TERRI L	
ART UNIT	**PAPER NUMBER**
3762	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/649,406	BANGE ET AL.	
	Examiner	Art Unit	
	Terri L. Smith	3762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 August 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *08/02/2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: reference character 202 is designated as "A/D converter" (page 5, lines 24 – 25) and as "analog-to-digital converter (ADC)" (page 6, line 16). It is acknowledged that the terms are one in the same. However, to comply with 37 CFR 1.84(p)(4) and to achieve clarity and consistency throughout the specification, drawings, and claims, designating reference character 202 the same throughout the application would be appropriate. The same applies to reference character 113 (see page 6, line 24, "matched filter"; page 9, line 4, "FIR matched filter" and "FIR filter").

Applicant states "Both broadband and narrowband noise ..." on page 2, lines 2 – 3. In light of this statement, on page 11, line 17, should the first word be "broadband" rather than "narrowband?"

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1 – 13 and 15 – 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, the phrase "to receive a signal ... an implantable medical device" (line 2) is inferentially included and vague. It is unclear if the signal and implantable medical device are being positively recited or functionally recited. It is suggested to use "adapted to receive."

Claim 2 is vague in that the signal has not been positively recited and therefore the programmer structure should be used to limit the signal.

In claim 9, "a transmit pulse" (line 2) is inferentially included.

In claim 10, "a captured noise-free signal" is inferentially included and confusing. How is it possible for a signal to be noise-free?

In claim 11, the phrase "signal corresponding to" (line 2) is inferentially included. Regarding the phrase "... a time-reversed version of the transmit pulse" (lines 2 – 3), the claim is incomplete for omitting an element to make a "time-reversed version" of "the transmit pulse."

Claim 12 recites the limitation "the transmit pulses" in lines 1 – 2. There is insufficient antecedent basis for this limitation. Further, "a threshold value" is inferentially included.

In claim 15, "a transmit pulse" (line 2) is inferentially included.

In claim 16, "a threshold value" (line 3) is inferentially included.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1 – 3 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Weijand, U.S. Patent 5,999,857.

Regarding Claim 1, Weijand discloses an antenna (Fig. 1, element 72) to receive a signal transmitted from an implantable medical device (Fig. 1, element 60), a signal including a carrier signal (column 2, lines 47 – 48) modulated with transmit pulses by amplitude shift keying (column 2, line 44; column 17, line 20), transmit pulses generated by an implantable medical device; analog receiver circuitry coupled to an antenna (Fig. 1, element 73); at least one filter (Fig. 11, element 75) coupled to an analog receiver circuitry, at least one filter having frequency characteristics dynamically adjustable based on at least one peak frequency in a noise spectrum of a received signal (column 13, lines 10 – 45); a noise spectrum detector (Fig. 12), coupled to at least one filter, to detect at least one peak frequency in a noise spectrum (Fig. 13; column 13, lines 27 – 35); and a pulse detector (Fig. 15, element 86), coupled to at least one filter, to detect transmit pulses.

Regarding Claim 2, Weijand discloses a signal has a bandwidth of approximately 10 to 150 kilohertz. (Fig. 17, element 90; column 14, line 17).Regarding Claim 3, Weijand discloses an analog-to-digital converter (Fig. 11, element 76), coupled between an analog receiver circuitry (Fig. 11, element 74 and at least one filter (Fig. 11, element 75) to digitize a received signal (column 12, lines 56 – 58), and one digital filter (Fig. 15, element 82) having dynamically adjustable filter coefficients (column 13, lines 56 – 58).

Regarding Claim 19, Weijand discloses receiving a signal (Fig. 1, element 72) transmitted from an implantable medical device (Fig. 1, element 60), a signal including a carrier

signal (column 2, lines 47 – 48) modulated with transmit pulses by amplitude shift keying (column 2, line 44; column 17, line 20), transmit pulses generated by an implantable medical device; detecting a noise spectrum of received signal (column 13, lines 10 – 45); detecting one or more peak frequencies in a noise spectrum (Fig. 13; column 13, lines 27 – 45); adjusting frequency characteristics of one or more filters based on the detected one or more peak frequencies in a noise spectrum (column 13, lines 10 – 45); filtering a received signal using one or more filters (column 13, lines 26 – 45); and detecting transmit pulses from filtered received signal (column 13, lines 17 – 23).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 4 – 18 and 20 – 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weijand as applied to Claims 3 and 19 above, and further in view of Rakib et al., U. S. Patent 6,426,983.

Regarding Claim 4, Weijand does not disclose a filter synthesizer, coupled between a noise spectrum detector and at least one filter, to synthesize at least one filter based on at least one peak frequency in the noise spectrum. However, Rakib discloses a filter synthesizer (Figs. 2 and 5, element 40), coupled between a noise spectrum detector (Figs. 2 and 5, element 36) and at

least one filter (Fig. 2, to despreader) to synthesize at least one filter based on at least one peak frequency in the noise spectrum (column 6, lines 27 – 31) to simultaneously remove multiple interfering signals (column 7, lines 19 – 20).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the device of Weijand to include a filter synthesizer, coupled between a noise spectrum detector and at least one filter, to synthesize at least one filter based on at least one peak frequency in the noise spectrum, as taught by Rakib, to simultaneously remove multiple interfering signals (column 7, lines 19 – 20).

Regarding Claim 5, Weijand does not disclose at least one digital notch filter to remove narrowband noise from a received signal. However, Rakib discloses at least one digital notch filter (column 6, lines 33 – 34; column 16, lines 49 – 50) to remove narrowband noise from a received signal (column 11, lines 27 – 31) to save on hardware complexity by using an array or notch filters (column 6, lines 50 – 51).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the device of Weijand to include at least one digital notch filter to remove narrowband noise from a received signal, as taught by Rakib, to save on hardware complexity by using an array or notch filters (column 6, lines 50 – 51).

Regarding Claim 6, Weijand does not disclose at least one digital notch filter has a notch frequency corresponding to at least one peak frequency in a noise spectrum. However, Rakib discloses at least one digital notch filter has a notch frequency corresponding to at least one peak frequency in a noise spectrum (column 16, lines 49 – 52) to simultaneously remove multiple

interfering signals (column 7, lines 19 – 20).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the device of Weijand to include at least one digital notch filter has a notch frequency corresponding to at least one peak frequency in a noise spectrum, as taught by Rakib, to simultaneously remove multiple interfering signals (column 7, lines 19 – 20).

Regarding Claim 7, Weijand does not disclose an infinite impulse response (IIR) notch filter. However, Rakib discloses an infinite impulse response (IIR) notch filter (column 9, line 16) to have low side lobes in its frequency response (column 8, line 56 – 57).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the device of Weijand to include an infinite impulse response (IIR) notch filter, as taught by Rakib, to have low side lobes in its frequency response (column 8, line 56 – 57).

Regarding Claim 8, Weijand does not disclose a digital matched filter, coupled between at least one digital notch filter and a pulse detector, to remove broadband noise from a received signal. However, Rakib discloses a digital matched filter (Fig. 1, element 18; column 4, line 35), coupled between at least one digital notch filter (column 5, lines 17 and 21 see bandpass filter) and a pulse detector, to remove broadband noise from a received signal (column 5, lines 13 – 25) to divide an input signal into a plurality of narrow subbands and have overlapping frequency responses so as to eliminate blind spots in analyzing an entire broadband spectrum (column 2, lines 52 – 55). In addition, Examiner takes Official Notice that it is well known in the art that bandpass filters remove broadband noise from signals.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the device of Weijand to include a digital matched filter, coupled between at least one digital notch filter and a pulse detector, to remove broadband noise from a received signal, as taught by Rakib, to divide an input signal into a plurality of narrow subbands and have overlapping frequency responses so as to eliminate blind spots in analyzing an entire broadband spectrum (column 2, lines 52 – 55).

Regarding Claim 9, Weijand does not disclose a finite impulse response (FIR) filter having coefficients derived based on a transmit pulse expected to be generated by an implantable medical device. However, Rakib discloses a finite impulse response (FIR) filter (Fig. 5, element 44; column 9, line 15) having coefficients (column 18, line 51) derived based on a transmit pulse expected to be generated by an implantable medical device, to establish a subband of frequencies centered on a different center frequency (column 18, lines 51 – 52).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the device of Weijand to include a finite impulse response (FIR) filter having coefficients derived based on a transmit pulse expected to be generated by an implantable medical device, as taught by Rakib, to establish a subband of frequencies centered on a different center frequency (column 18, lines 51 – 52).

Regarding Claim 10, Weijand does not disclose a digital matched filter has coefficients derived based on a captured noise-free signal transmitted from an implantable medical device. However, Weijand does disclose a digital filter has coefficients derived based on a captured noise-free signal transmitted from an implantable medical device (Fig. 14; column 13, lines 44 –

46 and 56 – 58).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Weijand with a digital matched filter adapted to have coefficients derived on a captured noise-free signal transmitted from an implantable medical device, to effectively remove noise spikes while the telemetry signal remains intact (column 13, lines 44 – 45).

Regarding Claim 11, Weijand does not disclose a digital matched filter is adapted to perform a convolution between a received signal and a signal corresponding to a time-reversed version of a transmit pulse expected to be generated by an implantable medical. Examiner takes Official Notice that it is well known in the art that filters perform convolution, and it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Weijand with a digital matched filter adapted to perform a convolution between a received signal and a signal corresponding to a time-reversed version of a transmit pulse expected to be generated by an implantable medical (column 14, lines 47 – 49 and 64 – 66) to enable a greater communication capability between the implanted devices and the external programmer (column 2, lines 24 – 26).

Regarding Claim 12, Weijand does not disclose a pulse detector detects transmit pulses by comparing an output of a matched filter with a threshold value. However, Rakib discloses a pulse detector detects transmit pulses by comparing an output of a matched filter (Figs. 2, element 31) with a threshold value (column 5, lines 60 – 66) to detect most instances of narrowband interferences (column 5, line 66).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the device of Weijand to include a pulse detector detects transmit pulses by comparing an output of a matched filter with a threshold value, as taught by Rakib, to detect most instances of narrowband interferences (column 5, line 66).

Regarding Claim 13, Weijand does not disclose a noise peak detector, coupled to a digital matched filter, to detect peak noise values in a digitized received signal; a signal peak detector, coupled to a digital matched filter, to detect peak signal values in a digitized received signal; and threshold adjustment circuitry for adjusting a threshold value based on peak noise values and peak signal values. However, Rakib discloses a noise peak detector, coupled to a digital matched filter, to detect peak noise values in a digitized received signal; a signal peak detector, coupled to a digital matched filter, to detect peak signal values in a digitized received signal; and threshold adjustment circuitry for adjusting a threshold value based on peak noise values and peak signal values (Figs. 3, 5 and 10; column 7, lines 1 – 20), to simultaneously remove multiple interfering signals (column 7, lines 19 – 20).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the device of Weijand to include a noise peak detector, coupled to a digital matched filter, to detect peak noise values in a digitized received signal; a signal peak detector, coupled to a digital matched filter, to detect peak signal values in a digitized received signal; and threshold adjustment circuitry for adjusting a threshold value based on peak noise values and peak signal values, as taught by Rakib, to simultaneously remove multiple interfering signals (column 7, lines 19 – 20).

Regarding Claim 14, Weijand discloses a means for receiving a signal (Fig. 1, element 72) transmitted from an implantable medical device (Fig. 1, element 60), the signal including transmit pulses generated by the implantable medical device. However, Weijand does not disclose means for removing narrowband noise from a received signal, including: means for detecting a noise spectrum of received signal; means for detecting frequency peaks in a noise spectrum; and means for synthesizing one or more filters based on detected frequency peaks in a noise spectrum.

Nonetheless, Rakib discloses means for removing narrowband noise from a received signal (column 11, lines 27 – 31), including: means for detecting a noise spectrum of received signal (Fig. 2, element 36); means for detecting frequency peaks in a noise spectrum (Fig. 3; column 7, lines 1 – 20); and means for synthesizing one or more filters based on detected frequency peaks in a noise spectrum (Fig. 3; column 7, lines 1 – 20) to simultaneously remove multiple interfering signals (column 7, lines 19 – 20).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the device of Weijand to disclose means for removing narrowband noise from a received signal, including: means for detecting a noise spectrum of received signal; means for detecting frequency peaks in a noise spectrum; and means for synthesizing one or more filters based on detected frequency peaks in a noise spectrum, as taught by Rakib, to simultaneously remove multiple interfering signals (column 7, lines 19 – 20).

Regarding Claim 15, Weijand does not disclose means for removing broadband noise from a received signal by correlating a received signal with a transmit pulse expected to be

generated by an implantable medical device. However, Rakib discloses means for removing broadband noise from a received signal by correlating a received signal with a transmit pulse expected to be generated by an implantable medical device (column 5, lines 16 – 25) to divide an input signal into a plurality of narrow subbands and have overlapping frequency responses so as to eliminate blind spots in analyzing an entire broadband spectrum (column 2, lines 52 – 55). In addition, Examiner takes Official Notice that it is well known in the art that bandpass filters remove broadband noise from signals.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the device of Weijand to disclose means for removing broadband noise from a received signal by correlating a received signal with a transmit pulse expected to be generated by an implantable medical device, as taught by Rakib, to divide an input signal into a plurality of narrow subbands and have overlapping frequency responses so as to eliminate blind spots in analyzing an entire broadband spectrum (column 2, lines 52 – 55).

Regarding Claim 16, Weijand does not disclose means for detecting transmit pulses by comparing an output of the means for removing broadband noise from a received signal with a threshold value. However, Rakib discloses means for detecting transmit pulses by comparing an output of the means for removing broadband noise from a received signal with a threshold value (Fig. 5, element 34; column 5, lines 13 – 25 and 60 – 66) to divide an input signal into a plurality of narrow subbands and have overlapping frequency responses so as to eliminate blind spots in analyzing an entire broadband spectrum (column 2, lines 52 – 55).

It would have been obvious to one of ordinary skill in the art at the time the invention

was made to have modified the device of Weijand to disclose means for detecting transmit pulses by comparing an output of the means for removing broadband noise from a received signal with a threshold value, as taught by Rakib, to divide an input signal into a plurality of narrow subbands and have overlapping frequency responses so as to eliminate blind spots in analyzing an entire broadband spectrum (column 2, lines 52 – 55).

Regarding Claim 17, Weijand does not disclose means for adjusting a threshold value based on a received signal. However, Rakib discloses means for adjusting a threshold value based on a received signal (Fig. 5, element 36; column 5, lines 60 – 66) to detect most instances of narrowband interference (column 5, lines 65 – 66).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the device of Weijand to disclose means for adjusting a threshold value based on a received signal, as taught by Rakib, to detect most instances of narrowband interference (column 5, lines 65 – 66).

Regarding Claim 18, Weijand does not disclose means for detecting peak noise values from a received signal; means for detecting peak signal values from a received signal; and means for dynamically adjusting a threshold value based on peak noise values and peak signal values. However, Rakib discloses means for detecting peak noise values from a received signal; means for detecting peak signal values from a received signal; and means for dynamically adjusting a threshold value based on peak noise values and peak signal values (Figs. 3, 5 and 10; column 7, lines 1 – 20) to simultaneously remove multiple interfering signals (column 7, lines 19 – 20).

It would have been obvious to one of ordinary skill in the art at the time the invention

was made to have modified the device of Weijand to disclose means for detecting peak noise values from a received signal; means for detecting peak signal values from a received signal; and means for dynamically adjusting a threshold value based on peak noise values and peak signal values, as taught by Rakib, to simultaneously remove multiple interfering signals (column 7, lines 19 – 20).

Regarding Claim 20, Weijand does not disclose adjusting frequency characteristics of one or more filters comprises dynamically synthesizing one or more digital notch filters to remove narrowband noise. However, Rakib discloses adjusting frequency characteristics of one or more filters comprises dynamically synthesizing one or more digital notch filters to remove narrowband noise (column 6, lines 33 – 38, lines 47 – 49, and lines 52 – 68) to simultaneously remove multiple interfering signals (column 7, lines 19 – 20).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the device of Weijand to disclose adjusting frequency characteristics of one or more filters comprises dynamically synthesizing one or more digital notch filters to remove narrowband noise, as taught by Rakib, to simultaneously remove multiple interfering signals (column 7, lines 19 – 20).

Regarding Claim 21, Weijand does not disclose dynamically adjusting notch frequencies according to detected one or more peak frequencies in a noise spectrum. However, Rakib discloses dynamically adjusting notch frequencies according to detected one or more peak frequencies in a noise spectrum (column 6, lines 52 – 68) to simultaneously remove multiple interfering signals (column 7, lines 19 – 20).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the device of Weijand to disclose dynamically adjusting notch frequencies according to detected one or more peak frequencies in a noise spectrum, as taught by Rakib, to simultaneously remove multiple interfering signals (column 7, lines 19 – 20).

Regarding Claim 22, Weijand does not disclose dynamically adjusting filter coefficients of one or more infinite impulse response (IIR) filters. However, Rakib discloses dynamically adjusting filter coefficients of one or more infinite impulse response (IIR) filters (column 9, line 15; column 3, lines 26 – 27) to have low side lobes in its frequency response (column 8, line 56 – 57).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the device of Weijand to disclose dynamically adjusting filter coefficients of one or more infinite impulse response (IIR) filters, as taught by Rakib, to have low side lobes in its frequency response (column 8, line 56 – 57).

Regarding Claim 23, Weijand does not disclose computing a power spectrum, P_i, of a received signal; and computing a noise spectrum, $P_n = P_i - R*P_e$, where P_e is a template spectrum precomputed from a representative received signal generated under noise-free conditions, and R is an average ratio of P_i to P_e. However, Rakib discloses computing a power spectrum (column 5, line 63), P_i, of a received signal; and computing a noise spectrum, $P_n = P_i - R*P_e$, (column 2, lines 63 – 65) where P_e is a template spectrum precomputed from a representative received signal generated under noise-free conditions, and R is an average ratio of P_i to P_e (column 15, lines 45 – 57) to determine if a narrow band interference signal is present in a bin (column 5, lines 61 – 62).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the device of Weijand to disclose computing a power spectrum, P_i, of a received signal; and computing a noise spectrum, $P_n = P_i - R*P_e$, where P_e is a template spectrum precomputed from a representative received signal generated under noise-free conditions, and R is an average ratio of P_i to P_e, as taught by Rakib, to determine if a narrow band interference signal is present in a bin (column 5, lines 61 – 62).

Regarding Claim 24, Weijand does not disclose computing spectral threshold values for detecting peak frequencies in a noise spectrum based on a mean and a standard deviation of P_n. However, Rakib discloses computing spectral threshold values for detecting peak frequencies in a noise spectrum based on a mean (column 2, lines 65 – 66) to look for and remove noise peaks (column 2, line 64 and column 3, line 3). Examiner takes Official Notice that it is well known in the art to use a mean and a standard deviation of P_n.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the device of Weijand to disclose computing spectral threshold values for detecting peak frequencies in a noise spectrum based on a mean and a standard deviation of P_n, as taught by Rakib, to look for and remove noise peaks (column 2, line 64 and column 3, line 3).

Regarding Claim 25, Examiner takes Official Notice that it is well known in the art to compute spectral threshold values by setting spectral threshold values at three standard deviations above the mean of P_n.

Regarding Claim 26, Weijand does not disclose filtering a received signal with a matched

filter to remove broadband noise. However, Rakib discloses filtering a received signal with a matched filter (column 4, lines 35 – 36) to remove broadband noise (column 5, lines 13 – 25) to divide an input signal into a plurality of narrow subbands and have overlapping frequency responses so as to eliminate blind spots in analyzing an entire broadband spectrum (column 2, lines 52 – 55). In addition, Examiner takes Official Notice that it is well known in the art that bandpass filters remove broadband noise from signals.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the device of Weijand to include filtering a received signal with a matched filter to remove broadband noise, as taught by Rakib, to divide an input signal into a plurality of narrow subbands and have overlapping frequency responses so as to eliminate blind spots in analyzing an entire broadband spectrum (column 2, lines 52 – 55).

Regarding Claim 27, Weijand discloses performing a convolution between a received signal and a digital signal corresponding to a time-reversed version of a transmit pulse expected to be generated by an implantable medical device (column 14, lines 47 – 49 and 64 – 66). Additionally, Examiner takes Official Notice that it is well known in the art that filters perform convolution.

Regarding Claim 28, Weijand discloses deriving filter coefficients based on a transmit pulse expected to be generated by an implantable medical device (Fig. 15 and column 13, lines 55 – 60).

Regarding Claim 29, Weijand discloses deriving filter coefficients for a finite impulse response (FIR) filter (Fig. 15; column 13, lines 55 – 60 and 61 – 62).

Regarding Claim 30, Weijand discloses capturing a noise-free signal transmitted from an implantable medical device (Fig. 14; column 13, lines 44 – 46 and 56 – 58).

Regarding Claim 31, Weijand does not disclose comparing an output of a matched filter with a threshold value. However, Rakib discloses comparing an output of a matched filter (Figs. 2, element 31) with a threshold value (column 5, lines 60 – 66) to detect most instances of narrowband interference (column 5, lines 65 – 66).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the device of Weijand to disclose comparing an output of a matched filter with a threshold value, as taught by Rakib, to detect most instances of narrowband interference (column 5, lines 65 – 66).

Regarding Claim 32, Weijand does not disclose detecting peak noise values in a received signal; detecting peak signal values in a received signal; and adjusting a threshold value based on peak noise values and peak signal values. However, Rakib discloses detecting peak noise values in a received signal; detecting peak signal values in a received signal; and adjusting a threshold value based on peak noise values and peak signal values (Figs. 3, 5 and 10; column 7, lines 1 – 20) to simultaneously remove multiple interfering signals (column 7, lines 19 – 20).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the device of Weijand to disclose detecting peak noise values in a received signal; detecting peak signal values in a received signal; and adjusting a threshold value based on peak noise values and peak signal values, as taught by Rakib, to simultaneously remove multiple interfering signals (column 7, lines 19 – 20).

Double Patenting

8. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

9. Claims 1 – 18 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 23 – 30 of U.S. Patent No. 6,622,044. Although the conflicting claims are not identical, they are not patentably distinct from each other because the patented claims meet the limitations of the application claims. Additionally, the patented claims do not include amplitude shift keying, analog receiver circuitry, a signal bandwidth with approximately 10 to 150 kilohertz, and other elements in claims 2 – 18. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the patented claims with the elements amplitude shift keying, analog receiver circuitry, a signal bandwidth with approximately 10 to 150 kilohertz, and other elements in claims 2 – 18, since it is known in receiver circuitry to include amplitude shift keying, analog receiver circuitry, a signal bandwidth with approximately 10 to 150 kilohertz, and other elements in claims 2 – 18 for removing noise. (For more specific motivation and reasoning, see the above 103 rejections.)

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Prem et al., U.S. Patent 5,630,836 teaches ASK modulation of a data signal upon a carrier signal.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Terri L. Smith whose telephone number is 571-272-7146. The examiner can normally be reached on Monday – Friday, between 7:30 a.m. - 4:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Angela Sykes can be reached on 571-272-4955. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TLS
February 28, 2005

GEORGE R. EVANISKO
PRIMARY EXAMINER
2/2/05